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- 17

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CONTENTS

	PAGE
Cockerell, Professor T. D. A., F.R.E.S. African Halictine bees (III) (Hym.)	7–10
Collin, J. E., F.R.E.S. A redescription of *Syrphus mecogramma* Bigot, and a note on the occurrence of probably the same species in Scotland (Diptera)	11–12
Macfie, J. W. S., M.A., D.Sc., M.B., Ch.B., F.R.E.S. A new species of *Culicoides* (Diptera, Ceratopogonidae) from Fiji	15–16, 2 figs.
Mistshenko, Leo. A new species of the genus *Conophyma* Zub. (Orthoptera, Acrididae) from British Baluchistan	13–14, 5 figs.
Someren, E. C. C. van, Ethiopian Culicidae—descriptions of the adults and pupae of two new species and two subspecies of the genus *Aëdes* from East Africa (Diptera)	1–6, 2 figs.
Book Notice	16

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PROCEEDINGS OF THE

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VOLUME 15. 1946.

ETHIOPIAN CULICIDAE—DESCRIPTIONS OF THE ADULTS AND PUPAE OF TWO NEW SPECIES AND TWO SUBSPECIES OF THE GENUS *AËDES* FROM EAST AFRICA (DIPTERA)

By E. C. C. van SOMEREN.

(*Section of Medical Entomology, Medical Research Laboratory, Nairobi, Kenya.*)

Aëdes (Stegomyia) langata sp. n.

THIS species is very similar to *A.* (*S.*) *calceatus* Edwards and *contiguus* Edwards but can be separated from *calceatus* by having less white on segments 1–2 of the mid tarsi and segments 3–5 all black, and also by having a very narrow white ring on the third hind tarsal segment. It differs from *contiguus* mainly in the male terminalia and probably by having yellow, instead of white, posterior sub-lateral lines on the scutum and sometimes by having more extensive white markings on the second tarsal segment of the mid legs.

Adult female. Head as in *calceatus* but often with a patch of yellow upright scales on the nape. *Thorax* as in *contiguus*. Differs as follows :—Short posterior sub-lateral lines on scutum yellow; median yellow line narrow anteriorly and broadening posteriorly and forking round the bare space in front of the scutellum. Sometimes some black scales on median lobe of scutellum. *Abdomen.* Dark scales with a purple or blue gloss; dorsal pale bands yellowish. First tergite sometimes with a pale median basal spot, second tergite with or without an incomplete pale basal band, tergites 3–5 with nearly complete, and 6–7 with incomplete, pale basal bands. *Legs* as in *contiguus*, differing as follows :—Dark scales with a purple sheen. Middle tibia dark and with a small white spot at the base on posterior surface; this spot sometimes absent. First segment of mid tarsi with a broad white ring at the base; second white all round on the basal quarter, black below on apical three-quarters, and white above for its full length or only on basal three-quarters. One specimen had only the basal half of the second mid-tarsal segment white above. Hind femur creamy white all round on the basal one-third and posteriorly to just over a half; anteriorly the white markings are continued forward in a broad silvery white stripe which curves upwards and extends to over a half. Hind tibia with a basal white ventral stripe which extends on to the anterior surface just beyond the base. Hind tarsi as in *contiguus*.

Male like the female. Variations noted as follows :—On one specimen the median yellow stripe on scutum is not continued to the front margin and is present on the posterior half only. Abdominal tergites 1–2 without pale markings, 3–5 with incomplete pale basal bands or median pale basal spots only. White spot on posterior surface of mid tibia very small and more often absent. Second segment of mid tarsi more often white above on basal half only.

Terminalia (fig. 1). Resemble those of *contiguus* but differ most obviously by having the lobes of the tergite well separate and by having 2 stout bent spines on the inner margin of the basal lobe. Coxite short and thick; style slightly curved, not tapering, and with a long dark spine at the tip. Basal lobe fairly large and covered with simple hairs; basal portion broad and with 2 bent spines on the inner margin, apical portion narrower and bent slightly inwards. Paraprocts with the usual ventral arm. Proximal teeth of phallosomes not much longer than the distal ones. Lobes of tergite well separate and with 7–8 hairs on each lobe.

Pupa. Very like *contiguus* as described by Edwards (1941). Additional characters noted as follows :—Dorsum of thorax and first 4 segments of abdomen dark. Paddles short and broad, round or oval (ratio of greatest breadth to length 1 : 1·2–1·5), with a dark mid-rib, and finely denticulate on the apical margin. Seta single and about one-quarter the length of the paddles. P and R single and about the same length; O single or bifid and much shorter and finer than P. K and S single and about the same length. H single and about one-half to two-thirds the length of K. T single and slightly shorter than S. C II with 2–4 branches; C III single or bifid. B II–VII single, but sometimes bifid on one side of the segment. A VII plumose, single, or with 2 branches which are one-half the length of A VIII, which has 3–6 plumose branches and is about one-half the length of the paddles.

Described from the male type, allotype female, 5 male, and 7 female paratypes, and 10 associated pupal pelts, bred from tree holes, Langata Forest, Nairobi, Kenya.

Fig. 1.—*A.* (*S.*) *langata*—Male terminalia.

Aëdes (Stegomyia) bambusae kenyae subsp. n.

The specimens described below were compared with paratypes of *A.* (*S.*) *bambusae* Edwards, very kindly sent to me by Mr. G. H. E. Hopkins, Senior Entomologist, Uganda. They are very similar to *bambusae* but can be readily distinguished by the presence of a white knee patch on the hind femora. The larvae can also be distinguished from those of the typical form and I therefore consider that this mosquito is worthy of subspecific status.

Adult female. Head as in *bambusae* Edwards (1941). Thorax as in *bambusae* but thoracic ornamentation and colour very variable. The yellow lateral patches and lines on scutum vary in colour from bright golden yellow to creamy white. The anterior horn of the lateral patches is produced forward along the front margin but this line is very narrow and sometimes very short and occasionally missing. The yellow lines on scutum

usually narrow but sometimes fairly broad and occasionally the yellow lines on either side of the bare space in front of scutellum meet the posterior lateral lines to form a large W. The two posterior lateral yellow lines do not always reach the posterior horns of the large lateral patches. The yellow patch on the pre-alar area usually paler, creamy white, or composed of silvery white scales which have a yellow sheen. *Abdomen* as in *bambusae* but white lateral patches often with a yellow sheen. *Legs* as in *bambusae* but mid femora with a large silvery white patch at tip on anterior surface, and hind femora with a small or fairly large white patch on anterior surface at tip; usually this marking is a short line of white scales extending backwards diagonally from dorsal surface at tip to ventral surface. Other characters noted (not mentioned for *bambusae* by Edwards, 1941, but noted for the paratypes of *bambusae* examined by me) are as follows :—A small white or yellowish basal patch of scales on posterior surface of mid tibia; the markings on second segment of mid tarsi variable, either a white band all round on the basal one-third and the apical two-thirds dark, or white all round on the basal one-third and white above for its full length or only on basal half to three-quarters and black below on apical half to two-thirds; hind tarsi with fourth segment black below at tip.

Male. Unfortunately no bred material is available but males collected at the same time as the females agree with the type female in every respect except that the yellow markings on the scutum tend to be paler, sometimes very nearly white, and the lines on the posterior half of scutum tend to be broader.

Terminalia. Like *bambusae* and essentially the same as those described for *deboeri* Edwards (1941). Basal lobe with 2–4 spines on inner border. Lateral lobes of tergite with 9–10 hairs on each.

Described from material collected in KENYA : Kaimosi, North Kavirondo, allotype female, holotype male, 7 female paratypes, and 2 male paratypes; Kitale, 3 females; Kisii, 30 females and 3 males (*P. C. C. Garnham, J. O. Harper, and R. B. Highton*).

Aëdes (Dunnius) michaelikati sp. n.

At the foot of p. 221 Edwards (1941) referred to specimens of this species (which he ascribed to *A.* (*D.*) *natalensis* Edwards), listing certain differences of ornamentation and of male terminalia between this species and *natalensis*. As the adult ornamentation appears to be very distinct, and as the shape and armature of the style of the male terminalia are constant in all specimens examined, I consider that the Gede material is worthy of a specific name and I am here describing it as *michaelikati* after Michael Ikata, African Entomological Assistant, Medical Department, Kenya, to whom I am indebted for bred material of this species.

This species differs from *natalensis* (ex description) and *albomarginatus* Newstead in having a wedge-shaped, white, median spot on the head dorsally, and by having a broad band of white scales on the front margin of the scutum, and a triangular patch of white scales on either side about the middle of scutum.

Adult female. General ornamentation as in related species of the subgenus. *Head* mainly dark with a distinct white stripe round the eye-margins and a wedge-shaped white spot in the middle in front, pointing backwards, and of variable size like that on *argenteo-ventralis* Theobald. *Thorax.* Broad white scales on the pleurae as in related species; scales on *ppn* all broad and white. Scutum covered with narrow dark brown scales and narrow white scales forming a definite pattern as follows :—A broad snow-white band on the front margin; a white triangular patch on either side about the middle, the apices of the triangular patches usually widely separate (Edwards mentioned that in the specimens

he examined the apices of these patches nearly reach the mid line but this was not noted in the specimens I examined); a very small patch of narrow white scales on the pre-alar area which extends to the base of the lateral triangular white patches; 3 short but distinct white lines posteriorly, all extending on to the scutellum as described by Edwards (1941). There is only one pair of dorso-central bristles just in front of the middle and at least 3, probably 4, pairs of pre-scutellar bristles.

Abdomen. Dark brown above and white below. Tergites 1–3 or only 1–2 with broad white lateral borders; 3–5 with large white basal lateral patches which extend to the apex to form a narrow white lateral border on the apical half; lateral patches on fifth tergite continued towards the middle to form a narrow white basal band; sixth tergite with a

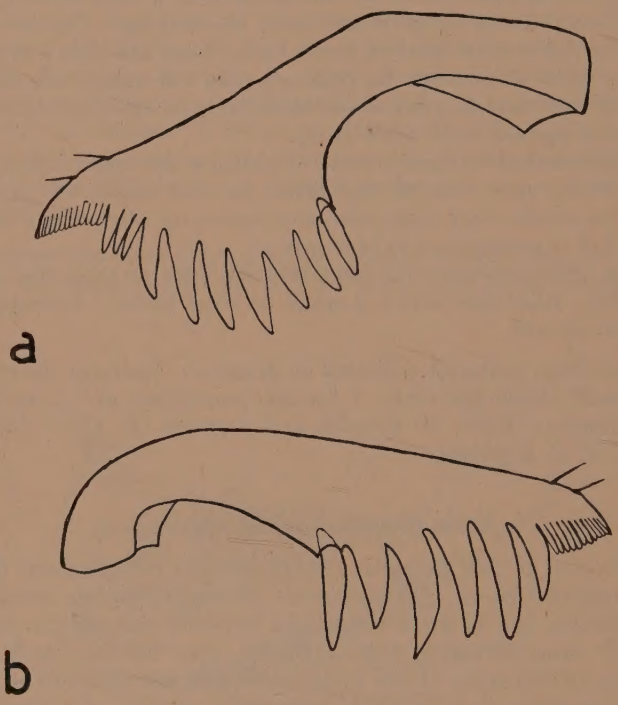


FIG. 2.—Male terminalia of *Dunnius* species. a. Style of *A.* (*D.*) *michaelikati gurneri*; b. Style of *A.* (*D.*) *michaelikati*.

very narrow white basal band; seventh with a broad white basal band. Sternites 1–5 white; 6 black with a narrow white apical band or only very small apical lateral white spots; 7 white with a broad black apical band. *Legs* dark brown. Anterior surfaces of fore and mid femora mainly dark with or without a narrow broken median line of white scales on the basal half to three-quarters, posterior surface dark above and pale below. Hind femur nearly all white but with a dark dorsal line on apical two-fifths to a half, or perhaps a little more, of anterior surface and with the dark scales extending on to the posterior surface to form an apical patch which narrows sharply towards the middle to merge with the dark dorsal line, and which covers almost the whole of the surface on the apical one-eighth to one-quarter, except for a narrow white ventral line. Fore and mid tibiae and all tarsi dark; usually with a creamy white line below for full length; hind tibia with a large white spot at the apex which is about twice as long as the diameter of the tibia.

Male like the female. Differs as follows :—Proboscis often with a white line below. The palpi have, on the basal half of the shaft, a varying number of white scales which tend to form 2 pale bands, one at the base and one about the middle. Sometimes only abdominal tergite 7 has a basal white band, sometimes 5–6 or 5–7 with white bands, and sometimes 5 and 7 only.

Terminalia (fig. 26). Very like *natalensis* but shape and armature of style different. Style much narrower apically and with the short stout teeth on the distal margin differently arranged. The teeth are arranged in two groups, one of 6–8 prominent, widely spaced, stout teeth, and a group of very much shorter, narrower, closely set teeth; the proximal 2 large teeth are shorter than the following 3 (thus differing from *natalensis*, as figured by Edwards, 1941, where these teeth are shown as gradually decreasing in size), and the most proximal tooth is spine-like and much narrower than the following 5–6. There is a group of about 15 stout hairs on the basal lobe below the 5 flattened, round-tipped bristles; this character is not mentioned in the description of *natalensis* by Edwards (1941) but one such hair is illustrated in his figure.

Pupa. Very much as described for the subgenus by Edwards (1941) and indistinguishable from *argenteoventralis* var. *dunni* Evans. Additional characters noted as follows :—B II–VII single, not very long, not gradually decreasing in length to segment VII. C II–V about half the length of B, with 2–3 branches (usually 2) but occasionally single on one side of the segment only. A VII and VIII moderately well developed; A VII about two-thirds the length of A VIII and with 3–5 plumose branches; A VIII with 4–5 plumose branches which are more than half the length of the paddles. Paddles pale, short and rounded (the ratio of the greatest breadth to length is 1 : 1·2), with a strong dark mid-rib, and small but distinct spicules on the distal margin; seta single and about one-fifth the length of the paddles.

Described from the male type, female allotype, 14 male paratypes, and 7 female paratypes, and 3 pupal pelts, Gede, Kenya.

Aëdes (Dunnius) michaelikati gurneri subsp. n.

Differs from *michaelikati* mainly in the shape and armature of the style of the male terminalia.

Adult female as in *michaelikati* but may possibly be distinguished by the following combination of characters :—Dark scales of scutum, abdomen, and legs darker than those of *michaelikati*, these scales being very dark black-brown and sometimes almost black. Abdominal tergites 5 and usually 6 without basal white bands but basal lateral white patches visible dorsally and tergite 6 sometimes with a small median basal white spot or a very narrow basal white band. Hind femur darker posteriorly on apical half, the apical two-fifths or more being dark on almost the whole surface except for a narrow ventral white line; the dark dorsal line usually extends to over a half.

Male like the female and differs from *michaelikati* by having no white scales on the palpi, or very few at the base. Proboscis seldom with a white line below.

Terminalia (fig. 2, a). Very like *natalensis* and *michaelikati* but style of different shape. Teeth on distal edge of style arranged much as in *michaelikati* but usually there are more large teeth (8–10), those in the middle larger than those on either side. There are fewer stout hairs (about 10) on the basal lobe below the 5 flattened round-tipped bristles.

Pupa. Indistinguishable from *michaelikati* but C V–VII more often single and A VIII two-thirds to three-quarters the length of the paddles. Paddles sometimes round and sometimes oval as in the figure of *argenteoventralis* Edwards (1941); ratio of greatest breadth to length 1 : 1·1–1·5.

Described from the male type, female allotype, 3 female and 2 male paratypes, and 5 pupal pelts, bred from tree holes in the Langata Forest, near Nairobi, Kenya, and 7 males from the City Park, Nairobi (*Gurner R. Cunningham van Someren*).

The following notes will indicate the position where the adults here described will come in the Keys as given in Edwards, *Mosquitoes of the Ethiopian Region*, Part III.

Key to Ethiopian Species of Subgenus Stegomyia pp. 126–8.

Couplet 12. Delete second alternative and substitute :—

Scutal markings all yellow; all femora dark at tip or mid and hind femora with small white spots at tip . . . . . 24.

Couplet 22 second alternative after *contiguus* Edw. (p. 145) add and *langata*.

Key to Species of Subgenus Dunnius p. 219.

Delete couplet 3 and substitute :—

3. A broad band of white scales round front margin of scutum and 2 triangular patches of white scales on either side about the middle . *michaelikati*.
Few white scales on scutum, not forming a distinct pattern as above . . 4.

Add a new couplet as follows :—

4. From Belgian Congo, Uganda, and Kenya . . *albomarginatus* Newst.
From Natal . . . . . *natalensis* Edw.

Reference.

Edwards, F. W., 1941, *Mosquitoes of the Ethiopian Region*, Part III.

CORRIGENDUM.

In my notes on *Charaxes* in the Hope Department (1945, *Proc. R. ent. Soc. Lond.* (B) **14** : 84) I cited two female *kahldeni* from the Mongalla Province of Sudan. This entry should be cancelled as the diagnosis was incorrect.

G. D. Hale Carpenter.

AFRICAN HALICTINE BEES (III) (HYM.)

By Professor T. D. A. Cockerell, F.R.E.S.

(*University of Colorado.*)

Halictus mabangensis sp. n.

♀. Length about 5 mm., anterior wing 4 mm.; black, including antennae, the mandibles obscurely reddish; pubescence scanty, dull white, the postscutellum with pale tomentum; clypeus not produced, having a shining reversed V, the upper end of which meets the shining spot of supraclypeal area; on each side of base of antennae is a rather large shining area; front dull, with a narrow shining line along orbits; mesonotum dull, faintly shining on disc; scutellum shining along anterior margin; area of metathorax large, shining, basally sculptured, the microscope shows coarse plicae, long in the middle, short at sides, and the surface is very weakly tessellate; tegulae black, faintly brownish; wings hyaline, stigma pale brown, nervures light brown, outer nervures weakened; second submarginal cell broad, receiving recurrent nervure near apical corner; legs black, the tarsi reddish at end; abdomen short and broad, brilliantly shining, tergites 2 and 3 with rather narrow basal bands of pale tomentum, that on second interrupted in middle. Under the microscope, the mesonotum is seen to be minutely tessellate, with very small punctures.

Sierra Leone: Mabang, 4 Aug., 1929 (*E. Hargreaves*). Related to *H. plicatinus* Ckll., as shown in the table below.

Halictus aburiellus sp. n.

♀. Length about 5 mm., anterior wing 4·5 mm.; black, with red mandibles, and the flagellum very obscurely reddish beneath; pubescence scanty, not evident on face, postscutellum covered with tomentum; face broad; clypeus not produced, the flattened shining area triangular, meeting the shining area on the supraclypeal space; the general effect of the clypeus and supraclypeal area is dull, but there is a brilliantly shining spot at each side of base of antennae; a shining band on each side of front; mesonotum dullish, but evidently shining on disc, the microscope shows a minutely roughened and feebly punctate surface, with a little hair; scutellum shining; area of metathorax rather large, shining, but coarsely sculptured, the microscope shows irregular dense plicae; tegulae light reddish; wings dusky hyaline, stigma rather light brown; nervures brown, but the outer ones very pale; second submarginal cell receiving recurrent nervure near apical corner; legs very dark brown, small joints of tarsi light red; abdomen short and very broad, shining; second and third tergites with basal bands of pale tomentum, broadened at sides, failing in middle on second.

Gold Coast: Aburi, 1912–13 (*W. H. Patterson*). Compared with *H. aburiensis* Ckll., from the same locality, this is smaller, with much paler stigma, much more shining mesonotum, and red tegulae. The last two species may be separated from various superficially similar small species as follows:—

Mesonotum highly polished . . . . . 1.
Mesonotum dull or dullish . . . . . 2.

1. Second tergite with a broad basal band of tomentum, the others bandless *latesellatus* Ckll.

Tergites with narrower bands, third with an apical as well as basal band *mesogonus* Ckll.

2. Mesonotum entirely dull . . . . . *boswendiellus* Ckll.
   Mesonotum partly shining, but not at all polished . . . . . 3.
3. Area of metathorax dull . . . . . *brevissimus* Ckll.
   Area of metathorax shining . . . . . 4.
4. Area without evident plicae . . . . . *epichlorops* Ckll.
   Area with very distinct plicae . . . . . 5.
5. Tegulae red; abdomen very broad . . . . . *aburiellus* Ckll.
   Tegulae black or almost; abdomen ordinary . . . . . 6.
6. Basal band on second tergite broad, entire . . . . . *plicatinus* Ckll.
   Basal band on second tergite represented by a cuneiform mark on each side *mabangensis* Ckll.

Halictus epichlorops Cockerell.

♀. Length about 5·5 mm.; black, with scanty white (not at all ochreous) pubescence; head broad, clypeus prominent, it and the supraclypeal area polished; triangular shining area on clypeus narrow at upper end, meeting the shining area on supraclypeus; mandibles black, flagellum dusky reddish beneath except at base; no conspicuous hair on face or front; mesonotum dull, moderately shining on disc; scutellum shining; the microscope shows the mesonotum to be minutely lineolate, with very small well-separated punctures; postscutellum not covered with pale tomentum; area of metathorax rather large, apically shining, rugosely sculptured basally, the microscope shows strong short plicae at the base, then a dull area, then a shining one; tegulae very dark, slightly brownish; wings greyish; stigma dusky reddish; nervures brown, outer nervures weak; recurrent nervure interstitial; legs black, with small joints of tarsi reddish; abdomen robust, shining, the second and third having triangular patches of hair at sides, the fourth with a pallid margin, and a broad entire basal of tomentum, not reaching sides; venter with pure white outstanding hair.

KATANGA: Elisabethville (*Michael Bequaert*). This is the larger form, of which I now have three specimens. I am still unable to separate it as a different species.

Halictus rubritarsis Cockerell.

♀. Length about 8 mm., anterior wing 6 mm.; black, robust, with white hair, abundant at sides of face and thorax, forming a band, enlarged in middle, on postscutellum, but the mesonotum without marginal bands; broad tarsi, and small joints of the other tarsi, red; mandibles with a red mark; antennae black; head broad; clypeus somewhat shining, with a median groove; supraclypeal area dull; mesonotum dull, slightly shining, especially posteriorly; scutellum bigibbous, somewhat shining; area of metathorax glistening, with dense pliciform sculpture; tegulae dark brown; wings hyaline, faintly dusky; stigma narrow, very pale reddish; nervures pale; second submarginal cell rather narrow, parallel-sided, receiving recurrent nervure at the extreme apical corner; third submarginal not very broad; abdomen with continuous bands of white tomentum at bases of second and third tergites, both rather narrow, and an interrupted band on fourth; apex black. The hind spur has a series of small denticles on the apical half. The area of metathorax, under the microscope, shows strong vermiform ridges.

KATANGA: Lubumbashi, 8 July, 1920 (*Michael Bequaert*). A specimen from Entebbe, Uganda, Oct. 1912 (*C. C. Gowdey*) is referred to the same species. It appears to have the band at base of third tergite much broader, but this is due to the greater extension of the abdomen. The mesonotum is quite hairy anteriorly. Compared with other Uganda species, it resembles *H. nairobiensis* Ckll., but that has the face much narrower, tegulae black, etc. It also resembles *H. zonaturus* Ckll., but has the head broader and larger, and the mesonotum dull.

Halictus (Oxyhalictus) michaelinus sp. n.

♂. Length 8 mm., anterior wing 6 mm.; black, without hair-bands or spots, except that there is some whitish tomentum at lateral bases of second and third tergites; antennae black, normally long for a male; clypeus much elevated, entirely black; mandibles black; pubescence white, conspicuous on front, scutellum and pleura; tubercles with a fringe of white hair; mesonotum and scutellum dull; area of metathorax a narrow band, crossed by very strong plicae; tegulae black; wings dusky, stigma and nervures brown, outer nervures not weakened; second submarginal cell contracted above, receiving recurrent nervure some distance from end; legs black, tarsi reddish only at tip; abdomen broad, with a dark apical plate, and a large rectangular projection on each side.

Belgian Congo : Lubumbashi, Katanga, 14 June, 1920 (*Michael Bequaert*). *H. libericus* Ckll. is smaller, and the thorax and abdomen are much narrower. *H. ituricus* Ckll. has hyaline wings and red tarsi. Seeking a possible female for *H. michaelinus*, I note that *H. crassivenis* Ckll. has many of the same characters, and it comes from practically the same locality, but it is impossible to associate it definitely with *H. michaelinus*. I had intended to call this " michaelis," but Vachal has used that name for a South American bee.

Halictus monsleonis sp. n.

♀. Length 7·6 mm., anterior wing 6 mm.; black, with white bands on bases of tergites 2 to 4, represented by cuneiform marks, failing in middle, on 4 almost wholly concealed; mesonotum slightly shining, densely punctured; area of metathorax with very strong plicae, the intervals shining. This is so like *H. lukulensis* Ckll. that I had taken it for the same species, but it is less robust, with the abdominal bands all interrupted, and the hind spur has two lamellae, one short and stout, like the end of a finger, the other small and rounded, like the one in *H. michaelsoni* Friese. The clypeus is shining, but the supraclypeal area is not polished; disc of scutellum shining, with scattered strong punctures, and a groove down the middle; tegulae very dark brown; wings faintly dusky; second submarginal cell receiving recurrent nervure near end; outer nervures weakened. The mouth-parts are elongated. No patches of white hair on sides of first tergite.

Sierra Leone : Njala, 26 July (*E. Hargreaves*). The front spur resembles that of *H. macrurops* Ckll., from Tshibinda, which is similar in many respects but differs by the area of metathorax and the banding of the abdomen.

A second female, with the same data, differs by lacking the median groove on mesonotum, but appears to be the same species. There is also a male, with the same data, which I must refer here. It has the clypeus produced, all black; antennae short for a male; mesonotum somewhat shining; legs black; hair at bases of tergites indistinct. It resembles male *H. libericus* Ckll., and except for the fact that it is rather smaller and less robust, it is hard to find any differences. It has a spine, or stout hair, at each side of end of abdomen, and this is also true of *H. libericus*. The female *H. monsleonis* is conspicuously larger and more robust than *H. libericus*. Perhaps *H. monsleonis* should be considered a race of *H. libericus*.

Halictus perpansus Cockerell.

Turner took both *H. perpansus* and *H. partitus* Ckll. at Mossel Bay, and both occur at Graaff Reinet. The characters are variable, and I now incline to think that *H. partitus* is only a variety of *H. perpansus*. It is even possible that both should be considered varieties of *H. andreniformis* Friese. At Johannesburg, 19 May, 1901, Distant took the variety of *H. perpansus* (var. *tricolor* Cam.) which has no transverse black band on the first tergite.

Halictus albofasciatus Smith.

Cape Province : Somerset East, male (*Turner*).

Halictus pearsoni Cockerell.

Cape Town, Lion's Head, many males (*Turner*); Camps Bay, females (*Turner*). This was included by Friese in his *H. tenuimarginatus*, and is perhaps to be considered a western subspecies of that.

Halictus valligenis Cockerell.

A female from Elisabethville, 25 April, 1920 (*Michael Bequaert*), has the mandibles partly reddish, and the first abdominal tergite largely green. Seven females collected by Michael Bequaert are referred to this species, but they are smaller, with the head not enlarged and the cheeks not dentate. The clypeus and supraclypeal area are elevated and shining. Three of these are labelled Elisabethville, 25 and 29 April, 1920; three Lubumbashi (which is practically the same locality), 2 May to 10 June, 1920; one La Panda, 2 Oct., 1920.

It is possible that the form with the ordinary head is *H. centrosus* Vachal, which has the first tergite green. *H. valligenis* belongs to the subgenus *Seladonia*, but the abdominal hair-bands are not always evident. In the key to *Seladonia* in Aug. 1940, *Ann. Mag. nat. Hist.* (11) **6** : 182, this runs to 5, but runs out on account of the black abdomen.

Halictus hotoni Vachal.

I have already recorded this from widely separated localities across Africa, and have suggested that perhaps the specimens represented more than one species. Forms now ascribed to *H. hotoni* come from Gbanga, Liberia, Sept. 1926 (*J. Bequaert*), Elisabethville, Katanga, 2 May, 1920 (*M. Bequaert*), and Bogoro, Belgian Congo, 7 July, 1914 (*J. Bequaert*). But in the Katanga specimen the area of metathorax is subangulate behind, in the Liberia one it is rounded. In the Bogoro one the legs are darker than is typical, and the general colour is blue-green, whereas Vachal's type is brassy green. But at Bogoro, on the same day, was taken a brassy green specimen, but it is much larger, with copious red hair on thorax above, and must be referred to *H. banalianus* Strand. All these are females. What is evidently a male *H. hotoni* was taken at Lubumbashi, 23 Feb., 1921. It has long antennae, the flagellum red beneath; a yellow mark at end of clypeus; mandibles reddish; tibiae at each end, and tarsi entirely, pale yellowish; there is a basal hair-band on second tergite. A female *H. hotoni* was taken by J. Bequaert at Kabinda, Belgian Congo, on *Vernonia*.

Halictus jucundus Smith.

Liberia : Banga, Oct. 1926 (*J. Bequaert*). A male, about 8·5 mm. long, anterior wing 6 mm.; area of metathorax large, pointed behind; hair of head and thorax white; flagellum dull red beneath; tegulae pale testaceous. Without more material, I cannot decide whether this is a distinct race, as would be expected from the locality.

Halictus banalianus Strand.

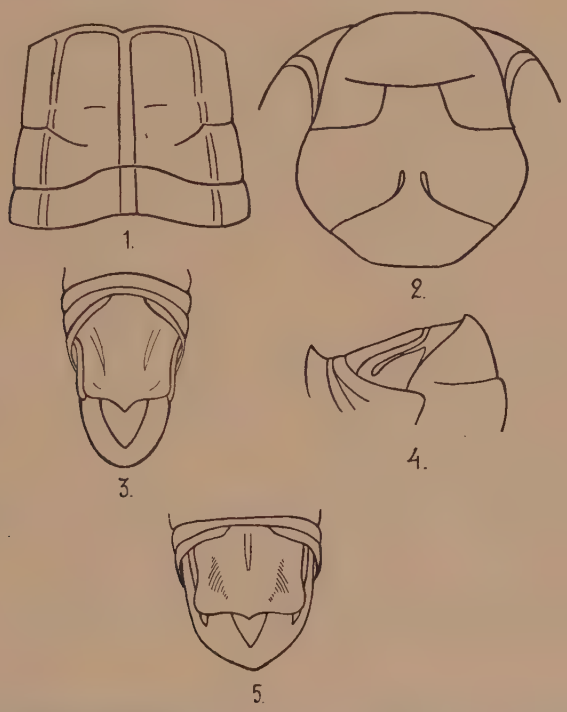
A female from Uganda : Kampala, 4 Dec., 1918 (*C. C. Gowdey*), is referred here with some doubt, as it is in bad condition. The thorax above is denuded, but what little hair remains does not suggest that it was red. The abdomen is brassy green; the area of metathorax is short, but strongly angulate behind. It is possible that more and better material may indicate a distinct species.

A NEW SPECIES OF THE GENUS *CONOPHYMA* ZUB. (ORTHOPTERA, ACRIDIDAE) FROM BRITISH BALUCHISTAN

By Leo Mistshenko.

(*Leningrad.*)

In the winter of 1937 the author received through Dr. B. P. Uvarov two specimens of *Conophyma* Zub. from British Baluchistan, for determination, and they proved to belong to an undescribed species.



Figs. 1–5.—1, *Conophyma baludzhianum* sp. n., ♂. Dorsal view of the pronotum; × 8·5. 2, *Conophyma baludzhianum* sp. n., ♂. Meso- and metanotum; × 8·5. 3, *Conophyma baludzhianum* sp. n., ♂. Dorsal view of the abdominal apex; × 8·5. 4, *Conophyma baludzhianum* sp. n., ♂. Lateral view of the abdominal apex; × 8·5. 5, *Conophyma bej-bienkoi* Mistsh., ♂. Dorsal view of the abdominal apex; × 8·5.

Conophyma baludzhianum sp. n. (figs. 1–4).

♂ (Holotype).—Body small, smooth, with sparse hairs. Head large, strongly projecting forwards. Vertex weakly impressed, without any median keel; width of the vertex between the eyes almost 1·25 times that of the frontal ridge between the antennae. Antennae fairly thick. Pronotum short, minutely and densely punctured in the prozona, coarsely punctured and scarcely wrinkled in the metazona; anterior transverse furrow slight, other transverse furrows distinct; median keel distinct; lateral keels almost entire, almost parallel-sided and sharp in the anterior part, slightly divergent in the median and

posterior parts, obliterated at the posterior margin; lateral lobes almost square. Mesonotum minutely punctured, without any lateral keels; median keel very slight. Metanotum minutely punctured, median keel and lateral keels slight. Prosternum with a short conical projection. Meso- and metasternum sparsely punctured; minimum width of the interspace between the mesosternal lobes almost 1·25 times its length; maximum width of the metasternum almost equal to length of the meso- and metasternum together. Middle femora slightly swollen. Hind femora thick; length of the femur almost 3 times its maximum width. Upper side of the hind tibia with 8 spines on the outer, 9 spines on the inner margin. Arolia between the claws of the tarsi small, almost reaching the middle of the claws. The first abdominal tergite minutely punctured, with a distinct median keel and with distinct lateral keels. Furcula of the last abdominal tergite almost absent, rounded, broadly-spaced; interspace between the furcula trapezoidal. Supra-anal plate smooth, trapezoidal, hardly narrowed towards the apex, with a sharp triangular projection on the middle of the posterior margin; its maximum width hardly less than its maximum length; posterior angles broadly-rounded, very weakly projecting sideways. Cerci straight, not reaching the apex of the posterior median projection of the supra-anal plate; in profile sharply conical, pointed. Apex of the subgenital plate conical.

General coloration black. Lower part of the head brownish. Antennae brownish. Pro-, meso- and metanotum with two longitudinal brownish stripes above. Lower part of the lateral pronotal lobes yellow-brownish. Sternum, lower part and apex of the abdomen yellow-brownish. Metasternal episternum with an oblique yellow ridge. Legs yellowish above. Inner side of the hind femur darkish, lower margin orange at the base. Hind tibiae dirty-yellow; tibia weakly orange at the apex. Abdomen with three longitudinal brownish stripes above.

Female unknown.

Length of the body ♂ 13·3; pronotum ♂ 3·0; hind femur ♂ 8·0 mm.

Patria.—British Baluchistan: Khan Meter-zai near Quetta, 2134 m., v.1931, 1 ♂ (holotype) (*D. Harrison*); Chiltan Forest near Quetta, 2134 m., 14.v.1931, 1 ♀ larva (*D. Harrison*).

Types in the British Museum (Natural History).

This new species is near to *Conophyma bej-bienkoi* Mistshenko,[1] described from North Afghanistan, but differs from it in the following characters:—

1(2). ♂. Supra-anal plate trapezoidal, narrowed towards the apex; its maximum width hardly less than its maximum length; posterior angles hardly projecting sideways (fig. 3). Cerci not reaching the apex of the posterior median projection of the supra-anal plate *C. baludzhianum* sp. n.

2(1). ♂. Supra-anal plate almost square, not narrowed towards the apex; its maximum width hardly larger than its maximum length; posterior angles distinctly projecting sideways (fig. 5). Cerci hardly extending beyond the apex of the posterior median projection of the supra-anal plate . . . . . *C. bej-bienkoi* Mistsh.

The discovery of this endemic species in British Baluchistan is a very interesting fact, since it belongs to the middle-asiatic genus *Conophyma* Zub., the representatives of which, up to the present time, have not been found so far south.

[1] Mistshenko, L., Some data on the fauna: *Blattodea*, *Mantodea*, *Phasmodea* and Orthoptera of North Afghanistan. 1937, *J. Bombay nat. Hist. Soc.* **39** (4): 806–7.

A NEW SPECIES OF *CULICOIDES* (DIPTERA, CERATOPOGONIDAE) FROM FIJI

By J. W. S. Macfie, M.A., D.Sc., M.B., Ch.B., F.R.E.S.

Culicoides cancrisocius sp. n.

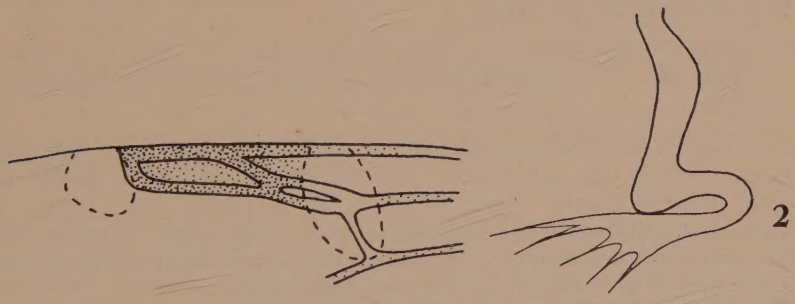
A black or blackish species with wings bearing numerous macrotrichia, adorned with numerous rather ill-defined pale areas, and with the second radial cell long, rectangular, almost entirely dark. Hypopygium of male somewhat similar to that of the African species *C. accraensis* C., I. & M.

♂♀. Length of wing 1·2–1·3 mm., greatest breadth 0·4–0·5 mm.

Head black. Eyes hairy in part at least. Palpi rather dark brown; third segment inflated distally, with large, shallow, sub-apical pit. Antennae rather dark brown. In male, plume dark, rather small: last three segments darker than others, elongate, subequal, 30–37 by 5–6 units,[1] and 3–4 times as long as 12. In female, segments 4–10 from sub-spherical to oval, 10 about 10 by 9 units; 11–14 elongate, from 23 to 27 units; 15 longer, about 39 units.

Thorax blackish, not spotted. Scutellum and postscutellum black, the former bearing usual 4 bristles, and a few small hairs.

Wings brownish, resembling those of the Oriental species *C. flumineus* Macfie. Macrotrichia numerous: in female covering greater part of wing excepting radial areas and extending to base between M and Cu; in male distributed over distal half of wing, with a few also in anal cell. Costa extending about two-thirds length of wing. Both radial cells well formed (fig. 1), second large, rectangular, the end of R_{4+5} bent up sharply to meet costa, not slanting gradually towards it. Pale spot just beyond end of costa small, covering only extreme tip of R_{4+5}; pale area enveloping cross-vein scarcely extending beyond M and only just reaching costa, but covering basal half of first radial cell. Other pale areas indistinct and not easily perceptible by transmitted light but apparently as in *C. flumineus*. Halteres darkish brown but containing white substance in knobs.



Culicoides cancrisocius sp. n.: Fig. 1.—Radial cells of wing of female. Fig. 2.—One of the harpes of male, lateral view.

Legs almost uniformly dark brown excepting for somewhat paler zones on each side of the dark brown knees. T.R. 2–2·4. Fourth tarsal segment cylindrical, not cordiform.

Abdomen black or blackish. Spermathecae two, very dark, sub-equal, small, collapsed

[1] The unit referred to is approximately 3·7 μ.

in both the specimens examined but apparently oval, about 42 μ by 37 μ, with the duct narrow and chitinised for only a short distance, about 7 μ. Hypopygium of male dark brown, similar in form to that of *C. accraensis* C., I. & M. Ninth tergite broad posteriorly, with triangular lateral processes and a flange-like lobe on each side of middle line, but not cleft or notched. Ninth sternite with shallow ventral excavation; membrane joining it to aedeagus not spiculate. Side-pieces with double root-like processes on inner side at base. Claspers with curved, somewhat spoon-shaped distal ends, the bases bearing a group of about 7 stout bristles. Harpes branched (fig. 2), similar to those of *C. accraensis*. Aedeagus also similar to that of *C. accraensis*, the anterior limbs as seen in ventral view narrow, very dark, forming a very wide arch.

Fiji: Suva, 3.iv.1945, 4 ♂, 2 ♀, "ex crab hole" (*R. A. Lever*).

This insect resembles *C. flumineus* Macfie, a species found in Malaya of which only the female is known, but its wings have a longer second radial cell, and a rather larger pale area enveloping the cross-vein. The greater development of this pale area, the occurrence of other pale areas (although rather indistinct) at the periphery of the wings, and the presence of a pit in the third palpal segment, differentiate it from *C. melanesiae* Macfie, a species found in New Britain of which, too, only the female is known.

The types of this new species are in the British Museum (Natural History).

Book Notice.

Handbook of the mosquitoes of North America. Their anatomy and biology; how they can be studied and how identified; how they carry disease and how they can be controlled. By R. Matheson. 2nd edition. 8vo. Ithaca, N.Y. (Comstock Publishing Company, Inc.). 1944. Pp. viii + 314, 33 pls. (included in pagination), 41 figs. Price $4.00.

This book forms volume 5 of the series "Handbooks of American Natural History," edited by A. H. Wright, and is a revised edition of a work first published in 1929.

It is arranged in two parts:—

Part I. Mosquitoes: a comprehensive survey. Pp. 1–86, and
Part II. A systematic account of North American mosquitoes. Pp. 89–260.

Part I deals with characteristics of mosquitoes, their biology, their relation to human welfare, the problem of their reduction and how to study, collect, rear and preserve them.

Part II is systematic and includes keys to subfamilies, tribes, genera and species and gives a description of each of the North American species with a brief account of the biology, habits, and distribution.

The Handbook aims to provide "health officers, entomologists, sanitary engineers, and laymen [with] a ready means of identifying our native mosquitoes with suggestions for their control."

An extensive bibliography is included, arranged by subjects: general works, morphological, biological, taxonomic, and control.

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——. 1936, New species of Coccidae. *Trans. R. ent. Soc. Lond.* **84**: 901–936.

Titles of periodicals cited are to be abbreviated in the manner indicated in the *World List of Scientific Periodicals, 2nd edition*, 1934.

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1946.

WEDNESDAY, March 6, 20
„ April 3
„ May 1
„ June 5
„ October 2, 16
„ November 6, 20
„ December 4

1947.

WEDNESDAY, January 15 (ANNUAL MEETING)
„ February 5

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